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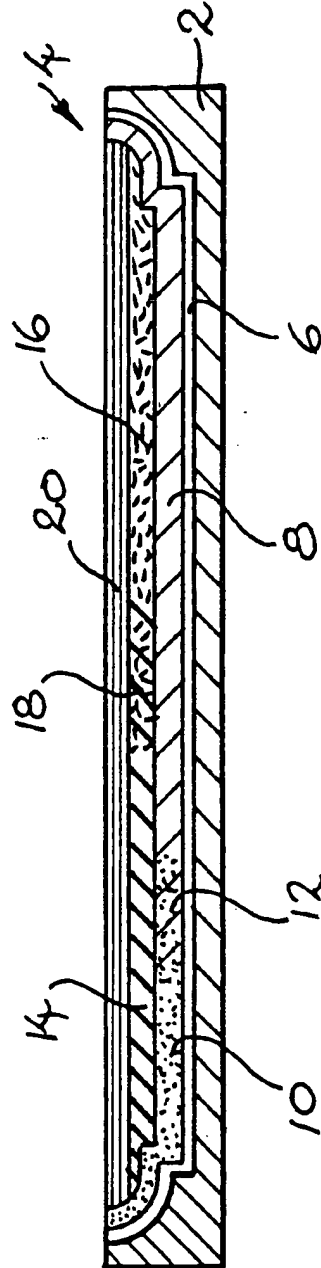
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(54) Process for producing an multicoloured article or material

(57) At least two differently pigmented liquid resins are applied to one surface of a transparent or translucent first layer; and cured or allowed to cure to form a second layer bonded to the first layer and thus provide an article or a material which has a novel appearance. The first layer may be produced by applying liquid resin to the inside of a mould or casing prior to the application of the pigmented resins. The differently pigmented resins, which may be the same base resin but with different pigments added, mix at their interface in a way which depends on the pigments themselves and on the technique used to apply them. The process can be used to produce a finish of novel appearance in which the colours have a quality of depth which is not found in articles or materials produced conventionally.

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Process for Producing an Article or a Material

This invention relates to a process for producing an article or a material and to articles or materials produced by the process.

I have discovered that by providing a transparent or translucent first layer; applying at least two differently pigmented liquid resins to one surface of the first layer; and curing the resins or allowing the resins to cure to form a second layer, I can obtain an article or a material which has a novel appearance. The differently pigmented resins, which may be the same base resin but with different pigments added, mix at their interface in a way which depends on the pigments themselves and on the technique used to apply them. The process can be used to produce a finish of novel appearance in which the colours have a quality of depth which is not found in articles or materials produced conventionally.

Although other first layers are envisaged, in the process as presently preferred, the first layer is produced by applying liquid resin to the inside of a mould and curing the resin in the first layer or allowing the resin to cure in the first layer before applying the differently pigmented resins to form the second layer. The first layer would normally be produced from a clear gel coat resin and subsequent layers from moulding or casting resin. Coloured articles produced by conventional processes have a rather

opaque pigmented gel coat which leads to a surface finish which has no appearance of depth.

The process preferably includes carrying out one or more times the steps of: applying one or more further differently pigmented resins to the cured second layer, and curing the one or more further resins or allowing the one or more further resins to cure, to form one or more further layers. At least one of the resins in the second layer is preferably pigmented with a translucent pigment so that further layers beyond the second produce an appearance of even greater depth.

The process may include bonding the resin layers to a support structure, with the first layer on the side of the opposite the support structure.

In one form the support structure is a board. In another form, the support structure comprises reinforced resin e.g., glass fibre. The appearance of the material or article may be different dependent on the support structure. The board may, for example, be opaque whereas resin reinforced with, say, glass fibre, may be translucent which would allow light to pass through the material or article from behind.

Compared to, say, conventional pigmented gel coats, the pigmented layers may be thick, for example, the, or at least one of the pigmented layers may be at least approximately 1 mm thick. Additionally or alternatively

th , or at least one of the pigmented layers may be at least approximately 2 mm thick, or even at least approximately 4 mm thick.

The process may be applied to the production of many different articles. Two examples are table tops and sculptures.

One example of the invention will now be described, by way of illustration only, with reference to the accompanying drawing which is a section through a mould for making table tops showing resins being applied thereto.

Referring to the drawing, a mould 2 has a cavity 4 shaped to form circular table tops.

To manufacture a table top the mould is set up with its cavity uppermost as shown. The inside surfaces of the mould are then coated with a release agent e.g. a wax as is known. Clear gel coat is then applied to the inside of the mould by any suitable method e.g. by brush, spray or pouring, and allowed to cure to form a first layer 6 of clear colourless cured resin. In other examples, the gel coat may be coloured, but it is important that it is transparent or at least translucent so that subsequent layers can be seen therethrough.

At least two differently pigmented polyester moulding or casting resins are then poured into the mould. Although the resin is the same in both cases, the pigments are different, being different colours or having different densities of the same colour. At least one of the resins is pigmented with translucent pigment. Two differently

pigmented resins are indicated in the drawing by a portion shaded by light hatching at 8 and a portion shown lightly flecked at 10. The resins are poured into the mould while both are liquid so that they mix at their interface as indicated by both light hatching and light flecking at 12. The colour which is produced by the mixture depends on the particular pigments. The pattern in which the two resins are applied is in the hands of the moulder. Many varied and attractive designs may be produced.

When the resins in the second layer have cured further pigmented resin is poured into the mould to produce a third layer. This may in some cases be a single colour e.g. white. In the case illustrated, however, and in many applications, at least two differently pigmented resins are added as indicated by heavy hatching at 14 and heavy flecks at 16. Again the two resins intermingle as indicated at 18.

The resins in the second and third layers are not so heavily pigmented as to have opaque surfaces. The pigments in the third layer, in particular, affect the appearance of the second layer. Thus the area 14 affects all the areas 8, 10 and 12 shown of the second layer, and both areas 16 and 18 affect the area 8 of the first layer. Designs of great beauty can be made having colours of spectacular depth.

A slab of casting or moulding resin may, perhaps, not have sufficient strength to function adequately as a table top and a support structure 20 is, therefore, bonded to the cast layers before removal from the mould. The

support structure shown is a layer of laminated wood board. Other boards may be used, e.g chip-board or block board. In another alternative, one or (preferably) more layers of glass fibre is or are laminated to the cast layers with laminating resin. Other reinforcements such as paper may be laminated to the cast resins with laminating resin. In a further arrangement a sandwich structure is laminated on the cast resins. First a layer of glass is applied and saturated with laminating resin. This is followed by a layer of "coremat" and a further layer of glass fibre, both of which are impregnated with laminating resin.

The process may be used to make a sheet material suitable for forming later into an article or for "glazing" for example.

The process may be carried out without a mould by using a preformed first layer. This may be a layer of cured resin e.g. gel coat or may be a sheet material e.g. acrylic which may be in sheet form or may be preformed into, say, a table top.

The process may also be used to produce other furniture, e.g., backs or seats for chairs, bathroom or kitchen furniture, or may be used to make coloured sculptures. Conventional processes for casting sculptures produce castings of one colour often imitating a natural material, e.g wood or metal. To produce castings of sculptures by the process would usually require the gel coat and subsequent layers to be applied by brush or spray. If the resin were applied by pouring, it would generally be

necessary to rotate the mould in order to ensure that the resin reached all parts of the mould.

A smooth layer of metallic foil (not shown) may be applied behind the layer or layers of coloured pigment. The foil may be applied to the final layer of pigmented resins when these are still wet. The foil may be smooth or wrinkled. Other items, e.g., logos or badges may be embedded in the second layer so as to be visible through the first layer. Thus a brewer or hotel chain might have tables incorporating a three dimensional company logo beneath the first layer.

Example

In one particular example, clear gel coat was applied to the inside of the mould 2 and allowed to cure. Three differently pigmented resins were then prepared using a translucent red pigment, a translucent yellow pigment and a translucent blue pigment, each in the same type of casting or moulding resin. A stripe of the red-pigmented resin was poured into the mould across one side. A stripe of the yellow-pigmented resin was applied across the middle of the mould, roughly parallel to the red stripe. A stripe of blue pigmented resin was then applied across the mould on the other side of the yellow strip from the red. Sufficient resin was applied in each stripe that the colours ran together and intermingled producing a green area between the yellow and blue stripes and an orange area between the red and yellow stripes. An amount of red was added to the blue stripe to produce a violet colour and more blue was added at the edge producing the effect of indigo.

The resins were allowed to cure to produce a coloured translucent layer. Opaque white pigment was then mixed with further casting or moulding resin and poured into the mould on top of the cured layer so that the overall effect was opaque, the white layer reflecting light back through the coloured layer in the manner that paper reflects light back through a water colour painting.

Finally a round plywood board was bonded to the back of the white layer using a laminating resin and the table top was removed from the mould.

CLAIMS

1. A process for producing an article or material, comprising: providing a transparent or translucent first layer; applying at least two differently pigmented liquid resins to one surface of the first layer; and curing the resins or allowing the resins to cure to form a second layer.
2. A process as claimed in claim 1, wherein the first layer is produced by applying liquid resin to the inside of a mould and curing the resin in the first layer or allowing the resin to cure in the first layer before applying the differently pigmented resins to form the second layer.
3. A process as claimed in claim 1 or 2, wherein at least one of the resins in the second layer is pigmented with translucent pigment, said process including carrying out the steps of: applying one or more further differently pigmented resins to the cured second layer, and curing the one or more further resins or allowing the one or more further resins to cure, one or more times to form one or more further layers.
4. A process as claimed in any preceding claim, including bonding the resin layers to a support structure, with the first layer on the side of the opposite the support structure.

5. A process as claimed in claim 4, wherein the support structure is a board.
6. A process as claimed in claim 4, wherein the support structure comprises reinforced resin.
7. A process as claimed in any preceding claim. wherein the, or at least one of the pigmented layers is at least approximately 1 mm thick.
8. A process as claimed in claim 7, wherein the, or at least one of the pigmented layers is at least approximately 2 mm thick.
9. A process as claimed in claim 7, wherein the, or at least one of the pigmented layers is at least approximately 4 mm thick.
10. Furniture or parts therefore, produced by a process as claimed in any preceding claim.
11. A sculpture produced by a process as claimed in any of claims 1 to 9.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(The Search report)

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Relevant Technical Fields

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(ii) Int Cl (Ed.5) B29C (39/12 AND 41/22)

Search Examiner
J P LEIGHTON

Date of completion of Search
20 MAY 1994

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE DATABASES: WPI

Documents considered relevant following a search in respect of Claims :-
1-11

Categories of documents

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| X: Document indicating lack of novelty or of inventive step. | P: Document published on or after the declared priority date but before the filing date of the present application. |
| Y: Document indicating lack of inventive step if combined with one or more other documents of the same category. | E: Patent document published on or after, but with priority date earlier than, the filing date of the present application. |
| A: Document indicating technological background and/or state of the art. | &: Member of the same patent family; corresponding document. |

Category	Identity of document and relevant passages		Relevant to claim(s)
X,Y	GB 2237238 A	(WOODALL & CHADBOURNE) Whole disclosure	1-4 at least
Y	GB 2172848 A	(J H JOHNSON) Whole disclosure	1 and 2 at least
X,Y	GB 1316694	(MOND INTERNATINAL) See page 1 lines 28-50	1-4 at least
Y	GB 1175497	(TALLINSKY POLITEKHNICHESKY) Whole disclosure	1 at least
X,Y	GB 0816927	(BECK KOLLER & CO) Whole disclosure	1 at least
Y	EP 0164847	(ICI) Whole disclosure	1 at least
Y	US 4244993	(P & G PRODUCTS) Whole disclosure	1 at least

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).